Homework #6

Deadline: Wednesday, 24 May 2023, 10:00

Exercise 1 (10 points)

In the context of some of the basic structural properties often used to describe TU games, either prove or disprove each of the following three statements:

 (a) Cohesiveness implies monotonicity.
 (b) Monotonicity implies cohesiveness.
 (c) All simple games are monotonic.

Exercise 2 (10 points)

We saw that a simple game has a nonempty core if and only if it has at least one veto player. Our proof of the right-to-left direction of this result was constructive: by distributing the value of the grand coalition evenly amongst all veto players, we defined a specific imputation x and then showed that x is in the core. Building on this idea, prove the following representation theorem for the core in simple games:

> *For a simple game with at least one veto player, an imputation is in the core if and only if it makes a zero payment to every player who is not a veto player.*

Finally, briefly comment on how to interpret this result. Is it a positive result?

Exercise 3 (10 points)

Recall the four axioms characterising the Shapley value for TU games. For each of them, either show that it is also satisfied by the Banzhaf value or give a counterexample.